

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

3SHAPE A/S,)	
)	
Plaintiff,)	
)	
v.)	
)	C.A. No. 18-886-LPS
ALIGN TECHNOLOGY, INC.,)	
)	CONSOLIDATED
Defendants.)	

REPORT AND RECOMMENDATION

Before the Court are the parties’ disputes over the construction of claim terms in United States Patent Nos. 9,629,551 (the “’551 Patent”), 9,962,244 (the “’244 Patent”), and 10,349,042 (the “’042 Patent”). The Court held a *Markman* hearing on April 21, 2020. I recommend that the Court adopt the constructions set forth below.

The parties agreed on the construction of four claim terms. In accordance with the parties’ agreement, I RECOMMEND that those terms be construed as follows:

	Term	Court
1	“... for detecting a movable object in a location, when scanning a rigid object in the location by means of a 3D scanner for generating a virtual 3D model of the rigid object” (’551 Patent, Claims 1, 23, and 25)	Preamble is limiting.
2	“the data processing system also configured to derive surface color information ... from at least one of the 2D images used to derive the surface geometry information” (’244 Patent, Claims 1 and 29)	“the data processing system configured to derive both surface geometry information and surface color information from the same at least one 2D image captured by said color image sensor”
3	“An intraoral scanner for providing data for 3D geometry of at least a part of the surface of an object in an oral cavity” (’042 Patent, Claims 1, 17, and 21)	Preamble is limiting.

4	“A method for providing data for 3D geometry of at least a part of the surface of an object in an oral cavity using an intraoral scanner” (’042 Patent, Claim 19).	Preamble is limiting.
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Further, as announced at the hearing on April 21, 2020, I RECOMMEND that the following disputed claim terms be construed as follows:

	Term	Court
1	“excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” (’551 Patent, Claims 1, 23 and 25)	[See construction for the entire claim phrase below.]
2	“determining/determine for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” (’551 Patent, Claims 1, 23 and 25)	“determining/determine for the first 3D representation a first excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present”
3	“determining/determine for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” (’551 Patent, Claims 1, 23 and 25)	“determining/determine for the second 3D representation a second excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present”
4	“if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is disregarded in the generation of the virtual 3D model” (’551 Patent, Claims 1 and 25)	“if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is permanently disregarded in the generation of the virtual 3D model after a single evaluation of the second excluded volume with the surfaces in the first 3D representation”
5	“if a portion of the surface in the second 3D representation is located in space in the first excluded volume, the portion of the surface in the second 3D representation is disregarded in the generation of the virtual 3D model” (’551 Patent, Claims 1 and 25)	“if a portion of the surface in the second 3D representation is located in space in the first excluded volume, the portion of the surface in the second 3D representation is permanently disregarded in the generation of the virtual 3D model after a single evaluation of the first excluded volume with the surfaces in the second 3D representation”

6	“disregard the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in the second excluded volume” (’551 Patent, Claim 23)	“permanently disregarding the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in space in the second excluded volume after a single evaluation of the second excluded volume with the surfaces in the first 3D representation”
7	“disregard the portion of the surface in the second 3D representation in the generation of the virtual 3D model, if a portion of the surface in the second 3D representation is located in the first excluded volume” (’551 Patent, Claim 23)	“permanently disregarding the portion of the surface in the second 3D representation in the generation of the virtual 3D model, if a portion of the surface in the second 3D representation is located in space in the first excluded volume after a single evaluation of the first excluded volume with the surfaces in the second 3D representation”
8	“where a surface portion in the second representation or the first representation, respectively, which is located within the near threshold distance from the captured surface and which is located in space in the first excluded volume or in the second excluded volume, respectively, is not disregarded in the generation of the virtual 3D model” (’551 Patent, Claim 13)	No construction necessary.
9	“a multichromatic light source for providing a multichromatic probe light for illumination of the object” (’244 Patent, Claims 1 and 29)	No construction necessary.
10	“a block of said image sensor pixels” (’244 Patent, Claims 1 and 29)	“two or more adjacent pixels of said image sensor pixels”
11	“surface color information” (’244 Patent, Claims 1 and 29)	“information relating to surface color”
12	“low weight” (’244 Patent, Claims 13 and 30)	Not indefinite at this stage.
13	“intraoral scanner” (’042 Patent, Claims 1, 17, 19, and 21)	No construction necessary.
14	“optical system” (’042 Patent, Claims 1, 17, 19, 21)	“an arrangement of optical components, e.g., lenses, that transmit, collimate and/or images light, e.g., transmitting probe light towards the object, imaging the pattern on and/or in the object, and imaging the object, or at least a part of the object, on the camera”

15	“focus plane” (’042 Patent, Claims 1, 17, 19, 21)	“A surface where light rays emitted from the pattern converge to form an image on the object being scanned. The focus plane does not need to be flat. It may be a curved surface.”
16	“the at least a part of the probe light” (’042 Patent, Claims 1, 17, 19, 21)	The antecedent for “the at least a part of the probe light” is “at least a part of the probe light from the lighting equipment through the optical system and towards the object.”
17	“image measure” (’042 Patent, Claims 6, 7, 14)	Indefinite.

I. LEGAL STANDARDS

A. Claim Construction

The purpose of the claim construction process is to “determin[e] the meaning and scope of the patent claims asserted to be infringed.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). When the parties have an actual dispute regarding the proper scope of claim terms, their dispute must be resolved by the judge, not the jury. *Id.* at 979. The Court only needs to construe a claim term if there is a dispute over its meaning, and it only needs to be construed to the extent necessary to resolve the dispute. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

“[T]here is no magic formula or catechism for conducting claim construction.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed. Cir. 2005). But there are guiding principles. *Id.*

“The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation.” *Id.* at 1313. In some cases, the ordinary meaning of a claim term, as understood by a person of ordinary skill in the art, is readily apparent even to a lay person and requires “little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314. Where the meaning is not readily apparent, however, the court may look to “those sources available to the public that show what a person of

skill in the art would have understood disputed claim language to mean.” *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). Those sources include “the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.” *Id.*

“The claims themselves provide substantial guidance as to the meaning of particular claim terms.” *Phillips*, 415 F.3d at 1314. For example, “the context in which a term is used in the asserted claim can be highly instructive.” *Id.* Considering other, unasserted, claims can also be helpful. *Id.* “For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314-15.

In addition, the “claims must be read in view of the specification, of which they are a part.” *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The specification “is always highly relevant to the claim construction analysis.” *Id.* (quoting *Vitronics*, 90 F.3d at 1582). The specification may contain a special definition given to a claim term by the patentee, in which case, the patentee’s lexicography governs. *Id.* at 1316. The specification may also reveal an intentional disclaimer or disavowal of claim scope. *Id.* However, “even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction.” *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (internal marks omitted).

Courts should also consider the patent’s prosecution history. *Phillips*, 415 F.3d at 1317. It may inform “the meaning of the claim language by demonstrating how the inventor understood

the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.” *Id.* Statements made by a patentee or patent owner during inter partes review may also be considered. *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1362 (Fed. Cir. 2017).

In appropriate cases, courts may also consider extrinsic evidence, which “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Markman*, 52 F.3d at 980. For example, dictionaries, especially technical dictionaries, can be helpful resources during claim construction by providing insight into commonly accepted meanings of a term to those of skill in the art. *Phillips*, 415 F.3d at 1318. Expert testimony can also be useful “to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Id.*; see also *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331-32 (2015).

B. Indefiniteness

Section 112 of Title 35 imposes a definiteness requirement on patent claims. 35 U.S.C. § 112(b) (requiring that the claims “particularly point[] out and distinctly claim[] the subject matter which the inventor . . . regards as the invention”). “The primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, *e.g.*, competitors of the patent owner, can determine whether or not they infringe.” *All Dental Prodx, LLC v. Advantage Dental Prod., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002).

“A patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those

skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Definiteness, like claim construction, should be assessed from the viewpoint of a person of ordinary skill in the art at the time the patent was filed, and it should be considered in view of the patent’s specification and prosecution history. *Id.* at 908.

The party asserting indefiniteness has the burden to prove it by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017).

II. THE COURT’S RULING

My Report and Recommendation regarding the disputed claim terms of the ’551, ’244, and ’042 Patents was announced from the bench at the conclusion of the hearing as follows:

My Report and Recommendation is as follows.

At issue in this case are three patents. U.S. Patent No. 9,629,551 is titled “Detection of a Movable Object When 3D Scanning a Rigid Object.” The ’551 patent has three groups of related terms in dispute. U.S. Patent No. 9,962,244 is titled “Focus Scanning Apparatus Recording Color.” The ’244 patent has four terms in dispute. U.S. Patent No. 10,349,042 is titled “Focus Scanning Apparatus.” The ’042 patent has five terms in dispute.

I’m prepared to rule on all of the disputed terms today. I will not be issuing a separate written Report and Recommendation but I will issue a written Report and Recommendation that incorporates my oral ruling today.

I want to emphasize before I announce my decision that while I am not issuing a separate decision in writing, we have followed a full and thorough process before making the decisions I’m about to state. We have reviewed the patents in suit. The parties submitted a very large stack of exhibits with their joint claim charts. (D.I. 80.) Those exhibits included portions of the prosecution history relied on by the parties as well as post-grant review documents and prior art.

There was also full briefing on each of the disputed terms. The parties submitted their briefing in accordance with Judge Stark’s procedures, so each side had the opportunity to submit an

opening brief on the disputed terms, and each side had the opportunity to submit an answering brief.

The parties' four briefs also attached numerous exhibits, including an expert declaration from Eli Saber, Ph.D., filed in support of 3Shape's answering claim construction brief, and 3Shape also submitted two declarations from Dr. Chandrajit Bajaj, that it originally submitted in related IPR proceedings. Align also submitted expert declarations from Karan Sher Singh, Ph.D., and Bruce W. Smith, Ph.D.

Plaintiff and Defendant each submitted a technology tutorial as well. Neither party elected to put on live expert testimony, but the Court permitted lengthy oral argument here today.

All of that has been carefully considered. To be clear, while my oral ruling will cite to the intrinsic and extrinsic evidence that I conclude [best] supports my recommended constructions, my failure to cite to other evidence provided by the parties does not mean that I ignored or failed to consider it. As I stated, I have considered all of the arguments and evidence cited by the parties.

Now as to my ruling.

As an initial matter, I am not going to read into the record my understanding of the general legal principles of claim construction. My understanding of the law of claim construction does not differ from that of Judge Stark's, for example, as he recently set forth in *Elm 3DS Innovations, LLC v. Samsung Electronics Co.*, [C.A. No. 14-1430, -1431, -1432, 2020 WL 1850657, at *1-3 (D. Del. Apr. 13, 2020)]. I will set out a legal standard in the written order that I issue.

Of course, a claim term is supposed to be given the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. And I note here that neither side has argued that any differences the parties may have in defining one of ordinary skill in the art for any of the three patents is relevant to resolving the disputes before me today.

Defendant has also argued that a number of the disputed terms are indefinite. I will also set out the general legal standard for indefiniteness in the written order that I issue. My understanding of the law of indefiniteness does not differ from the legal standard set forth in Judge Stark's opinion in *Elm 3DS [Innovations]*, 2020 WL 1850657, at *3].

I understand that the parties agree on constructions for four terms. And I recommend to Judge Stark that he adopt the agreed-upon constructions for those terms.

I'll start with the disputed terms in the '551 patent. As I mentioned, the '551 patent has 3 groups of related terms in dispute.

The first set includes what 3Shape refers to as the “excluded volume” terms and what Align refers to as the “determining” steps. They include the phrases: “determine” or “determining for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” and “determine” or “determining for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation.” Those phrases are found in claims 1, 23 and 25.

3Shape argues that the portion of the claim phrase “excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” should be construed as “excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present.” And 3Shape argues that the entire claim phrases should be construed as “determining for the first 3D representation a first excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present” and vice versa for the second 3D representation.

Align argues that the claim phrases are indefinite. In the alternative, Align argues that the claim phrases should be construed as “defining a common overlapping volume in space where no surface can be present from either of the 3D representations.”

The specification uses the subphrase “excluded volume” in a way that suggests that the “first excluded volume” could be determined without reference to the second 3D representation, and vice versa. (*See, e.g.*, '551 patent, 23:14-30, Figs. 9a, 9b.) The language of the claims themselves, however, requires that each of the first and second excluded volumes take into account both the first 3D representation and the second 3D representation.

The parties appear to agree that the patentee added that language to the claims during prosecution in order to overcome a rejection based on prior art. And the parties also agree that the

phrase “excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation” is narrower than how the specification refers to “excluded volume.” The parties also agree that 3Shape argued during the IPR process that the entire claim phrase is something narrower than how “excluded volume” is referred to in the specification.

Align argues that 3Shape’s narrowing of the terms during prosecution and the IPR proceeding rendered the terms indefinite. In support of its argument, Align offers the declaration of Dr. Karan Sher Singh, a Professor of Computer Science at the University of Toronto, who opined that, based on the claim language and arguments made by the patentee, a person of ordinary skill in the art would understand that the claimed first and second excluded volumes would be the same volume. (D.I. 101, Ex. 1 ¶¶ 21-41.) As I understand Dr. Singh’s declaration, he does not opine that a person of skill in the art cannot determine or calculate the first excluded volume or the second excluded volume. Rather, he argues that because the first excluded volume and the second excluded volume are the same, a person of skill in the art would not be able to calculate two different excluded volumes.

With regard to Align’s indefiniteness argument, for a claim to be held invalid for indefiniteness, there must be clear and convincing evidence. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, [912 n.10 (2014); *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017)]. At this time, the Court finds that Align has not met its burden to show indefiniteness. While Align’s expert opines that the first and second excluded volumes are the same, he does not appear to dispute that a person of skill in the art can in fact calculate them. Because of that, I decline to find at this time that the patent terms are indefinite. [Should there] still be a disagreement regarding these claim terms in the future, Defendant may raise the issue, if appropriate, after full fact and expert discovery.

Align has proposed an alternative construction, so I’ll discuss and resolve the differences between Align’s alternative construction and 3Shape’s construction.

As far as I can tell, there are basically two differences. One difference is that 3Shape’s proposal uses the words “common to both” and Align uses the word “overlapping.” I haven’t heard anyone today tell me what the difference is between “overlapping” and “common to both” and actually Align stated during the hearing

that there was no material difference. Accordingly, I'm going with "common to both."

The second difference is that Align's construction requires the definition of "first" and "second" common overlapping volumes in space, which sort of highlights Align's argument that there may be something wrong with a claim that requires a first thing and a second thing that are the same thing. Align also acknowledges that its own construction requires two different overlapping volumes, but Align agrees that there cannot be two different overlapping volumes. Align's construction also [omits] the language that "excluded volume" has to be determined "for the first 3D representation" and "for the second 3D representation."

3Shape's constructions, which include references to the first 3D representation and second 3D representation, are more consistent with the language of the claims and are also supported by its declaration from Dr. Saber at paragraph 37. (D.I. 108, Ex. 3 ¶ 37.)

Accordingly, on this dispute, I side with 3Shape. I construe the phrase "determine" or "determining for the first 3D representation a first excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation" as "determine" or "determining for the first 3D representation a first excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present."

And I construe the phrase "determine" or "determining for the second 3D representation a second excluded volume in space where no surface can be present in both the first 3D representation and the second 3D representation" as "determine" or "determining for the second 3D representation a second excluded volume in space that is common to both the first and second 3D representations where no surface from either of the 3D representations should be present."

The second set of terms to be construed in the '551 patent include what the parties refer to as the "disregarding" terms. They include the terms "if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is disregarded in the generation of the virtual 3D model" and "if a portion of the surface in the second 3D representation is located in space in the first excluded volume, the portion of the surface in the second 3D

representation is disregarded in the generation of the virtual 3D model.” Those phrases are found in claims 1 and 25.

There are also the related phrases “disregard the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in the second excluded volume” and “disregard the portion of the surface in the second 3D representation in the generation of the virtual 3D model, if a portion of the surface in the second 3D representation is located in the first excluded volume.” Those phrases are found in claim 23.

3Shape argues the Court does not need to construe any of those phrases. However, 3Shape agrees [that,] if construction is deemed necessary, the construction should include that the surface is permanently disregarded in the generation of the virtual 3D model.

Align argues that the claim phrases are indefinite. In the alternative, Align argues that the terms should be construed such that the surface portion is permanently not taken into account after a single evaluation of the excluded volume.

Align agreed during oral argument today that its indefiniteness argument is based on the same argument it made earlier, namely, that the first and second excluded volumes are the same. For the same reason as before, I find that Align has not met its burden to show indefiniteness at this time.

Align has proposed an alternative construction, so I’ll discuss and resolve the differences between Align’s alternative construction and 3Shape’s proposed construction. As far as I can tell, there are basically two differences.

One difference is that 3Shape uses the words “permanently disregarded” and Align uses the words “permanently not taken into account.” I haven’t heard anyone today tell me what the difference between “permanently disregarded” and “permanently not taken into account” is. But Align did say today that it would agree to use “permanently disregarded.” So that resolves that part of the dispute.

The other difference is that Align has added the phrase “after a single evaluation.” Align points out that the patentee used that phrase when distinguishing a piece of prior art during the IPR proceedings.

During the IPR proceedings, the patentee argued that the McQueston prior art reference does not disclose the “disregarding” steps. The patentee argued that “[t]he claimed invention requires that surfaces located in the excluded volumes be disregarded after a single evaluation of two (‘first’ and ‘second’) 3D representations” and that the McQueston prior art “does not disclose permanently disregarding surfaces that are present in a second 3D representation and absent in a first 3D representation.” (D.I. 80, Ex. A3 at paper 5, pages 2, 33-35.)

3Shape responds that its statements during the IPR were “merely describing one non-limiting manner by which the claimed invention differs from the prior art.”

Having carefully considered this portion of the dispute, I side with Align. 3Shape argued during the IPR that McQueston does not meet the “disregarding” steps of claims 1, 23, and 25 because those steps, as claimed, require that surfaces located in the excluded volumes are disregarded after a single evaluation of the excluded volumes with the surfaces in the first or second 3D representations. (See D.I. 80, Ex. A3, at paper 5, pages 2, 32-36.) See *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1359-1361 (Fed. Cir. 2017). That is a clear and unmistakable disclaimer.

Accordingly, I construe “if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is disregarded in the generation of the virtual 3D model” as “if a portion of the surface in the first 3D representation is located in space in the second excluded volume, the portion of the surface in the first 3D representation is permanently disregarded in the generation of the virtual 3D model after a single evaluation of the second excluded volume with the surfaces in the first 3D representation.” And I construe the vice versa [claim phrase] vice versa.

I also construe “disregard the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in the second excluded volume” as “permanently disregarding the portion of the surface in the first 3D representation in the generation of the virtual 3D model, if a portion of the surface in the first 3D representation is located in space in the second excluded volume after a single evaluation of the second excluded volume with the surfaces in the first 3D representation.” And I construe the vice versa claim phrase vice versa.

The final phrase to be construed in the '551 patent is in claim 13, which depends on claim 1. That term is “where a surface portion in the second representation or the first representation, respectively, which is located within the near threshold distance from the captured surface and which is located in space in the first excluded volume or in the second excluded volume, respectively, is not disregarded in the generation of the virtual 3D model.”

3Shape argues no further construction is necessary. Align asserts the claim is indefinite, or, if not indefinite, that the near threshold distance should be construed such that it is not included in the excluded volume. Align argues that the patentee characterized claim 1 during the IPR proceeding as requiring permanently disregarding a surface portion after a single evaluation and that to allow a dependent claim to not disregard a surface portion would fail to give effect to the patentee’s disclaimer.

I disagree with Align that the phrase is indefinite. Moreover, I don’t think that not adopting Align’s construction would permit 3Shape to recapture coverage that it disclaimed during the IPR. Rather, I believe that the language of claim 13 itself is more consistent with the construction such that a surface existing in an excluded volume will be permanently disregarded unless it is also found in the near threshold distance. That is consistent with how the near threshold distance is discussed in the specification. (*See, e.g.,* '551 patent, 27:32-38.)

Although I recognize that the specification describes a far threshold distance as defining or determining the excluded volume (*see id.*, 5:64-67), the near threshold distance does not. Rather, the near threshold distance defines how far from a representation or surface a possibly movable object can be disregarded. (*Id.*, 5:20-22.)

3Shape’s alternative proposed construction mirrors the claim language except that it adds the word “permanently” so it says “not permanently disregarded” instead of “not disregarded.” I actually think that introduces ambiguity. The claim says “not disregarded.” 3Shape’s proposal might mean that it could be disregarded as long as it is not done so permanently, but that is not what the claim says. Accordingly, I side with 3Shape and conclude that no further construction is appropriate.

Now I’ll move on to the '244 patent. As I mentioned, the '244 patent has four groups of related terms in dispute.

The first phrase is “a multichromatic light source for providing a multichromatic probe light for illumination of the object.” That phrase is found in claims 1 and 29 of the ’244 patent.

According to 3Shape, no construction of this phrase is necessary and it should be given its plain and ordinary meaning. Align proposes that it be construed as “a white light or multicolor light source which illuminates an object.” According to Align, the patent describes a single light source that can either be a white light source or multicolor light source. Align defines “multicolor” as “more than one color.”

I agree with 3Shape that Align’s proposed construction is unnecessary and unhelpful. First, it is unclear to me how construing “a multichromatic light source” as “a white light or multicolor light source” simplifies or clarifies the term.

Second, I am not persuaded that Align’s proposed construction is accurate. Although the specification makes it clear that white light can be used in embodiments of the claimed invention (*see, e.g.*, ’244 patent, 9:16-17, 5:23-25), the term “multicolor” proposed by Align is used nowhere in the specification. To the extent “multicolor” simply means “more than one color” as Align suggests, it is unclear to me how or if it differs from multichromatic.

Moreover, white light and multicolor light are both multichromatic light. Either these two types of light encompass all multichromatic light or they don’t. If they do, then I do not see why such a construction is necessary. If they don’t, then such a construction would be unnecessarily limiting.

The parties also appear to have a disagreement about whether the multichromatic light source must be a single light source, but I don’t understand how either party’s proposed construction resolves that dispute.

I conclude that the phrase “a multichromatic light source for providing a multichromatic probe light for illumination of the object” does not need further construction.

The second disputed phrase in the ’244 patent is “a block of said image sensor pixels.” That phrase is also found in claims 1 and 29. The parties agree that the phrase refers back to an earlier portion of the claim.

Claim 1, for example, provides in relevant part: “A focus scanner . . . comprising: . . . a color image sensor comprising an array of image sensor pixels for capturing one or more 2D images of light received from said object . . . [and] a data processing system configured to derive surface geometry information for a block of said image sensor pixels from the 2D images in the stack of 2D images captured by said color image sensor, the data processing system also configured to derive surface color information for the block of said image sensor pixels from at least one of the 2D images used to derive the surface geometry information.”

3Shape asserts that “one or more pixels” constitutes a block, whereas Align contends that a block must be a “two-dimensional array of adjacent sensor elements.” According to 3Shape, its proposal is consistent with the claim language, which is clear that a block must constitute something less than the entirety of the image sensor pixels. 3Shape also asserts that its proposal is consistent with the specification, which repeatedly refers to pixels on an individual level. Align, on the other hand, asserts that its construction is correct because it is consistent with dictionary definitions of “block” and certain embodiments in the specification that describe the “block” as a 2D array, such as a group of 6 x 6 pixels.

I don’t entirely agree with either proposal. On the one hand, I agree with Align that “a block” must be more than one pixel. The claim language itself requires a block of pixels, not a block of pixel. It’s plural. Moreover, although 3Shape points out that the specification refers to an embodiment in which individual pixels are evaluated in a certain way (*see, e.g.*, ’244 patent, 5:45-49), the claims in dispute require evaluation of a block of pixels. Moreover, another part of the specification distinguishes between pixel blocks and individual pixels. (*Id.*, 10:28-29.) To me, that reinforces that a block of pixels and an individual pixel are not the same thing.

I disagree with Align, however, that a block should be construed as a two-dimensional array. Although certain figures in the specification describe a block of pixels as a two-dimensional array (*see* 16:61-17:17, 18:65-19:18, Figs. 2A-2B, 6A-6C), that does not mean that the claimed invention is so limited.

While Align has submitted a declaration from Dr. Singh in which he opines that a person of ordinary skill in the art would understand the term to mean a two-dimensional array, his declaration does not say that a one-dimensional array of pixels could not accomplish the claimed function of deriving surface geometry and color information. (D.I. 101, Ex. 1 ¶¶ 63-66.) I don’t know if

it could or not, but his declaration doesn't state that it could not. And counsel for Align did not argue during the hearing today that the claimed function could not be accomplished with a one-dimensional array.

Moreover, the technical definition provided by Align does not include the phrase "two-dimensional array," but defines a block as "[a] collection of data units such as words, characters, or records . . . that are stored in adjacent physical positions in memory." (D.I. 100 at 11, Ex. 1B.) That does not indicate to me that a block must be a two-dimensional array as opposed to simply a collection or grouping in adjacent positions.

I [also] disagree with 3Shape's construction insofar as it doesn't really capture the idea of a "block." As Align points out, 3Shape's construction would permit random, non-adjacent pixels to be considered a block. In the absence of any sufficient alternative proposal from 3Shape to fix that issue, I agree with Align that use of the word adjacent is appropriate.

Accordingly, I reject both 3Shape's and Align's proposed definitions, instead construing "a block of said image sensor pixels" as "two or more adjacent pixels of said image sensor pixels."

The third disputed phrase in the '244 patent is "surface color information." That phrase is also found in claims 1 and 29. The phrase "surface color information" is used frequently in the claims and specification.

For example, claim 1 provides in pertinent part: "A focus scanner for recording surface geometry and surface color of an object, the focus scanner comprising: . . . a data processing system configured to derive surface geometry information for a block of said image sensor pixels from the 2D images in the stack of 2D images captured by said color image sensor, the data processing system also configured to derive surface color information for the block of said image sensor pixels from at least one of the 2D images used to derive the surface geometry information."

3Shape argues that "surface color information" is simply "information relating to surface color." Align contends that "surface color information" is "apparent color of an object surface." I agree with 3Shape.

Align's proposed construction reads the word "information" out of the phrase, providing a definition just for "surface color." Yet

the specification provides several examples where “information” is used to generate or derive the surface or object color. For example, the specification describes how “[i]n some embodiments, the data processing system is configured for determining a color for a point on a generated sub-scan based on the surface color information of the 2D image of the series in which the correlation measure has its maximum value for the corresponding block of image sensor pixels.” (’244 patent, 6:53-58; *see also id.*, 19:19-29.) The specification also states that “one advantage of the scanner system and the method of the current application is that the informations used for generating the sub-scan expressing both geometry and color (as seen from one view) are obtained concurrently.” (*Id.* at 4:9-13.) Those portions of the specification suggest that surface color information is information relating to surface color that can be used to generate or determine the surface color.

Align’s final argument is that 3Shape’s proposal cannot be right because it would broaden the term to include any subset of information, even if one could not determine surface color using that information. Align argues, for example, that under 3Shape’s definition any information even tangentially related to surface color, such as surface geometry information, would be included in the definition. I do not think 3Shape’s proposal is overly broad. If information is not related to surface color, then it will not be included. However, if some information relating to surface geometry is also related to the surface color, then that information will be included.

Accordingly, I construe “surface color information” as “information relating to surface color.”

The fourth disputed phrase in the ’244 patent is “low weight.” That phrase is found in claims 13 and 30.

Claim 13, for example, recites: “The focus scanner according to claim 12, wherein the error caused by the saturated pixel is mitigated or removed by assigning a low weight to the surface color information of the saturated pixel in the computing of the smoothed sub-scan color and/or by assigning a low weight to the sub-scan color computed based on the saturated pixel.”

Align argues that “low weight” is indefinite because a person of ordinary skill in the art would be unable to determine what is meant with reasonable certainty. In support of its argument, Align offers the declaration of Dr. Singh, who opined that the term “low weight” is not a term with an ordinarily understood technical

meaning and that it does not inform the scope of the invention. (D.I. 101, Ex. 1 ¶¶ 71-73.)

3Shape responded with a declaration from its expert, Dr. Saber, who opined that a person of ordinary skill in the art, reading the claims in light of the specification, would understand that low weight refers to assigning saturated pixels a lower weight in the color computation than that of unsaturated pixels. (D.I. 108, Ex. 3 ¶¶ 101-103.)

I have reviewed both expert declarations and the specification, including at '244 patent, 9:1-6, 11:46-48, and 11:59-67, which in my view support 3Shape's position that assigning a low weight to certain information means assigning a lower weight to that information to achieve the claimed result.

I find that Defendant has not met its burden to show indefiniteness at this time. Should there still be a disagreement regarding this claim term in the future, Defendant may raise the issue later, if appropriate, after full fact and expert discovery.

Align has not offered an alternative construction. 3Shape has not proposed a construction. Accordingly, I do not further construe this phrase.

Finally, I'll turn to the '042 patent. As I mentioned, the '042 patent has five groups of related terms in dispute.

The first claim phrase in dispute is "intraoral scanner." That phrase is found in every independent claim of the '042 patent: claims 1, 17, 19, and 21.

3Shape says the phrase needs no construction. Align proposes an "intraoral scanner" to mean "an intraoral scanning device that uses a pre-determined measure of the illumination pattern and contrast detection." In other words, Align wants every claim in the '042 patent to be limited to intraoral scanning devices that use a pre-determined measure of the illumination pattern and contrast detection.

According to Align, the parties' dispute about the construction of "intraoral scanner" is about whether the claims can encompass scanners that use certain prior art confocal imaging techniques, or, whether the claims are limited to scanners that use a pattern projection and contrast detection technique. Align argues that the patentee disparaged certain prior art confocal imaging

techniques in the background section of the specification, constituting a complete disavowal of scanners utilizing those techniques. (*See, e.g.*, '042 patent, 2:13-20, 1:62-67.) According to Align, and supported by a declaration from its expert, Dr. Bruce Smith (D.I. 101, Ex. 2 ¶¶ 15-23, 26-58), the asserted claims should not be read so broadly as to include the disparaged prior art, but rather should be “limited to the pattern projection and contrast measurement technique utilized by all described embodiments.”

According to 3Shape, “intraoral scanner” should be given its plain and ordinary meaning.

I am asked to construe the term “intraoral scanner.” On this dispute, I agree with 3Shape, and I find the cited case *Ventana Medical Systems, Inc. v. Biogenex Laboratories Inc.*, [473 F.3d 1173 (Fed. Cir. 2006)] instructive.

“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” [*Ventana*, 473 F.3d at 1181 (quoting *Phillips*, 415 F.3d at 1312).] Statements in the patent’s background section about how the claimed invention will improve upon prior art do not amount to a complete surrender of coverage of all prior art features irrespective of what is claimed. In addition, although the specification often describes very specific embodiments of the invention, the Federal Circuit has “repeatedly warned against confining the claims to those embodiments.” [*Id.*] The mere fact that the '042 patent only discloses embodiments that utilize techniques that use a pre-determined measure of the illumination pattern and contrast detection does not, in and of itself, mean that the claims at issue are limited to those embodiments. Moreover, there is no requirement that each claim cover every feature disclosed in the specification.

As between *Ventana* and the *SciMed [Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.]*, 242 F.3d 1337 (Fed. Cir. 2001)] case cited by Align during oral argument today, I believe the statements in the specification are closer to *Ventana*.

Align points out that the '042 patent claims priority to a provisional application filed in 2009 and that, unlike the '042 patent, all of the related patents stemming from that application expressly include the “spatial pattern” and “contrast detection” requirements that Align now seeks to incorporate in its construction of “intraoral scanner.” But that argument actually supports a conclusion that a person of skill in the art would not understand the term “intraoral scanner” to include those elements.

Align argues that it would be unfair to permit 3Shape to extend its claims beyond what it actually invented. In my view, however, that argument is more appropriate in the context of a written description argument than in the claim construction position taken here.

Accordingly, I decline to adopt Align's proposed construction. 3Shape has not offered a construction. Accordingly, I do not further construe the phrase "intraoral scanner."

The second claim phrase in dispute is "optical system." That phrase is also found in every independent claim of the '042 patent: claims 1, 17, 19, and 21.

3Shape argues that "optical system" needs no construction. Align, on the other hand, argues that the specification contains a definition for "optical system."

"To act as its own lexicographer, a patentee must 'clearly set forth a definition of the disputed claim term.'" *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, [1309 (Fed. Cir. 2014)] (quoting *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)).

The patent in this case has a section called "definitions" and one of the listed definitions is for the phrase "optical system." It is difficult for me to understand how the inclusion of an explicit definitions section, that includes a definition for the term at issue, would not amount to a clear intention to act as a lexicographer.

During the hearing today, the parties came to some agreement on construction of this term. As I understand it, neither party objects to the Court using the entire definition set forth in the specification. That definition states as follows: "Optical system: An arrangement of optical components, e.g. lenses, that transmit, collimate and/or images light, e.g. transmitting probe light towards the object, imaging the pattern on and/or in the object, and imaging the object, or at least a part of the object, [on the camera]." ('042 patent, 5:8-12.)

The parties agree that the first "e.g." refers only to lenses. And the second "e.g." refers to all of the words following it. I'm not going to further construe the phrase at this time.

The third claim phrase in dispute is “focus plane.” This phrase is also found in every independent claim of the ‘042 patent: claims 1, 17, 19, and 21.

Align’s proposed construction of this phrase is in accordance with the definition set forth in the definitions section in the specification.

As before, I conclude that the inclusion of express definitions in a “definitions” section demonstrates a clear intent on behalf of the patentee to act as its own lexicographer. Accordingly, I recommend that the definition provided for “focus plane” in the specification be adopted.

Align did not include some of the explanatory language in its original proposed construction. The complete definition states as follows: “Focus plane: A surface where light rays emitted from the pattern converge to form an image on the object being scanned. The focus plane does not need to be flat. It may be a curved surface.” (’042 patent, 5:4-7.)

3Shape indicated today that it desires the inclusion of that additional language in the construction. Align does not oppose that. Accordingly, I construe “focus plane” to mean the entire definition set forth.

I heard argument today that the construction should include additional information about what “pattern” means. That wasn’t briefed. I’m not going to further construe the phrase at this time.

The fourth claim phrase in dispute is “the at least part of the probe light.” This phrase is also found in every independent claim of the ’042 patent: Claims 1, 17, 19, and 21.

According to 3Shape, no construction is necessary because grammatically it is clear that “the at least a part of the probe light” refers to “at least a part of the probe light.” Align, on the other hand, argues that “the at least a part of the probe light” is anteceded by “at least a part of the probe light from the lighting equipment through the optical system and towards the object.”

I agree with Align’s position that you can’t really chop the phrase up. Align correctly notes that the use of the word “the” in a claim is referring back to an earlier use of the phrase or term that it precedes. *Cf. Intamin Ltd. v. Magnetar Techs., Corp.*, 483 F.3d 1328, [1333 (Fed. Cir. 2007)].

Claims 1, 17, 19, and 21 require that the intraoral scanner transmits at least a part of the probe light from the lighting equipment through the optical system and towards the object such that “the at least part of the probe light” is focused on certain claimed things. The only reasonable way to read that is that the antecedent for “the at least a part of the probe light” is “at least a part of the probe light from the lighting equipment through the optical system and towards the object.” And I construe the claim accordingly.

3Shape expressed a new concern during the hearing today about the relationship of the at least a part of the probe light to the claimed divergence angle. The dispute I’m resolving today relates solely to the antecedent of the at least part of the probe light.

The final claim phrase in dispute is an “image measure.” This phrase is found in dependent claims 6, 7, and 14.

Claim 6, for example, states, “the intraoral scanner according to claim 1, wherein the data for the 3D geometry is derived by calculating an image measure for several 2D images of the series of 2D images.”

Align argues that the term “image measure” is indefinite. The term “image measure” is not used or defined anywhere in the specification or prosecution history. Align also submitted a declaration from its expert, Dr. Bruce Smith, in which he stated that “image measure” is not a term with an ordinarily understood technical meaning in the field of 3D optical scanners. He further opined that the phrase “image measure” fails to inform a person of ordinary skill in the art with reasonable certainty about the scope of the claimed invention. (D.I. 101, Ex. 2 ¶¶ 59-67.) Align urges the Court, if it does not find the term “image measure” indefinite, to adopt the definition of “correlation measure” set forth in the specification as the proper construction for “image measure.”

3Shape argues that the plain meaning of “image measure” is clear. And although 3Shape is adamant that “image measure” means something different from “correlation measure,” it didn’t explain in its briefing what the term “image measure” means. Nor did it submit with its briefing any evidence from which I could conclude that image measure has a meaning to one of ordinary skill in the art reading the patent in light of the specification and prosecution history.

In sum, the record before the Court contains, on one side, an expert declaration opining that a person of skill in the art would not understand the scope of the term “image measure” and, on the other side, conclusory attorney argument that the term “image measure” is clear but no articulation as to what that clear meaning is.

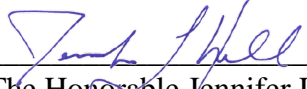
Under these circumstances, I believe that Align has met its burden to show by clear and convincing evidence that “image measure” is indefinite.

That concludes my claim construction rulings today.

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B),(C), Federal Rule of Civil Procedure 72(b)(1), and District of Delaware Local Rule 72.1. Any objections to the Report and Recommendation shall be filed within fourteen days and limited to ten pages. Any response shall be filed within fourteen days thereafter and limited to ten pages. The failure of a party to object to legal conclusions may result in the loss of the right to *de novo* review in the district court.

The parties are directed to the Court’s “Standing Order for Objections Filed Under Fed. R. Civ. P. 72,” dated October 9, 2013, a copy of which can be found on the Court’s website.

Dated: May 6, 2020



The Honorable Jennifer L. Hall
United States Magistrate Judge